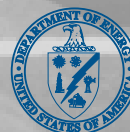


Research Reactor Decommissioning And Production Reactor Interim Safe Storage



*Completed C Reactor
Safe Storage Enclosure*

Progress - June 1998



U.S. Department of Energy
Office of Environmental Management
Office of Science and Technology

P roblem:

DOE is responsible for decommissioning about 270 surplus radioactively contaminated research reactors and 14 production reactors around the world. Innovative and improved technologies are needed to reduce the costs to safely store and decommission reactors, decrease the generation of waste, and improve worker safety. DOE, in partnership with other federal and state agencies, universities and the private sector are currently working to develop and apply technologies to meet this cleanup problem.

S olution:

The Deactivation and Decommissioning (D&D) Focus Area partnered with the Chicago Operations Office to demonstrate a suite of 23 improved D&D technologies during actual decommissioning work at the Chicago Pile 5 (CP-5) Research Reactor at Argonne National Laboratory. The Focus Area also partnered with the Richland Operations Office to demonstrate a suite of 20 improved technologies for Interim Safe Storage of the C Reactor, a surplus full-scale, non-operating production reactor. Through these efforts between EM's Office of Environmental Restoration, new technologies were developed that overcome shortcomings of the current suite of baseline technologies.

Following validation of their cost and other benefits, the technologies demonstrated at the CP-5 Research Reactor and C Reactor Large Scale Demonstration and Deployment Projects (LSDDPs) are now available for widespread deployment to decommission reactors. The CP-5 and C Reactor LSDDPs have demonstrated there are safer, more efficient, and less costly methods available for facility characterization, facility and equipment decontamination, dismantlement/robotics, and containment/worker protection.



B enefits:

- Demonstrates the ability to completely decontaminate and decommission a reactor facility with safer, faster, and cheaper technologies
- Provides full-scale facility to demonstrate multiple innovative and alternative technologies to obtain true side-by-side comparative cost and performance analyses to baseline methods under actual field conditions
- Leverages the resources of private industry, national laboratories, and international and domestic technology development companies

Characterization: Surface Contamination Monitor

OST Reference #1942

The Surface Contamination Monitor is a surface radiation detector that automatically prepares electronic maps and reports of a surveyed area. Superior to baseline techniques (floor monitors and hand-held instrumentation), this monitor precisely registers contamination locations and levels, while simultaneously storing this information in a database capable of producing real-time imagery and automated graphics of survey data.

Benefits:

- Meets federal detection limits required for surface survey instrumentation allowing for free release surveys
- Produces highly accurate mapping documents showing contamination locations and levels
- Switches easily from beta-gamma detection to alpha detection with no field calibration and accepts numerous detectors
- Reduces costs up to 57 percent compared to baseline technologies

Other Characterization Technologies:

2D Linear Motion System (#1476)

X-Ray Fluorescence (HEPA) Characterization (#1790)

Gamma Ray Imaging (#1793)

Pipe Crawler (#1810)

Field Transportable Beta Counting System (#1853)

Pipe Explorer™ System (#74)



Pipe Explorer™



2D Linear Motion System (#1476)

Decontamination: Concrete Shaver

OST Reference #1950

The concrete shaver is an electrically driven, self-propelled concrete and coating removal system. This technology consists of a 10-inch wide diamond impregnated shaving drum powered by an electric motor and contains a vacuum port for dust extraction.

Benefits:

- ▶ Reduces worker fatigue due to lower vibration
- ▶ Removes contamination five times faster than the pneumatic scabber
- ▶ Reduces cost by 50 percent compared to baseline technologies

Other Decontamination Technologies:

Rotopeen with Captive Shot (#1812)

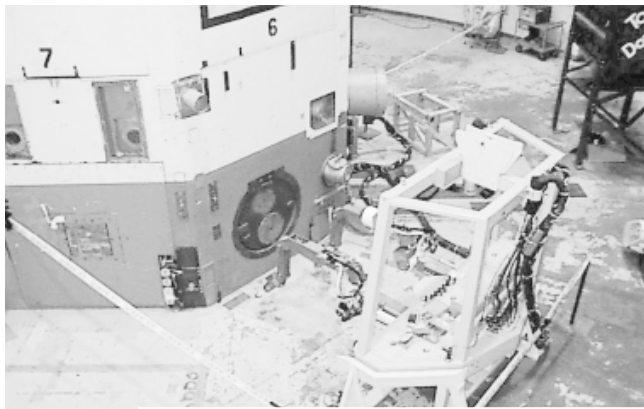
Centrifugal Shot Blasting (#1851)

Concrete Grinder (#2102)

Remote Scabber (#2099)



Concrete Grinder



DAWP

Dismantlement: Dual Arm Work Platform (DAWP)

OST Reference #1787

The DAWP is a remotely-operated deployment platform that uses a variety of end effectors to dismantle reactor internals. The platform supporting the two arms can be free standing or suspended from an overhead crane. End effectors range from crow bars to sophisticated saws.

Benefits:

- ▶ Reduces or eliminates radiation dose to workers via remote operation
- ▶ Adapts to a wide variety of end effectors
- ▶ Fits inside research reactors for dismantlement work

Other Dismantlement technologies:

Rosie Mobile Work System (#1799)

Swing Free Crane (#1815)

(Brokk) Remote Control Concrete Demolition System (#2100)

High-Speed Clamshell Pipe Cutter (#1807)



High-Speed Clamshell Pipe Cutter



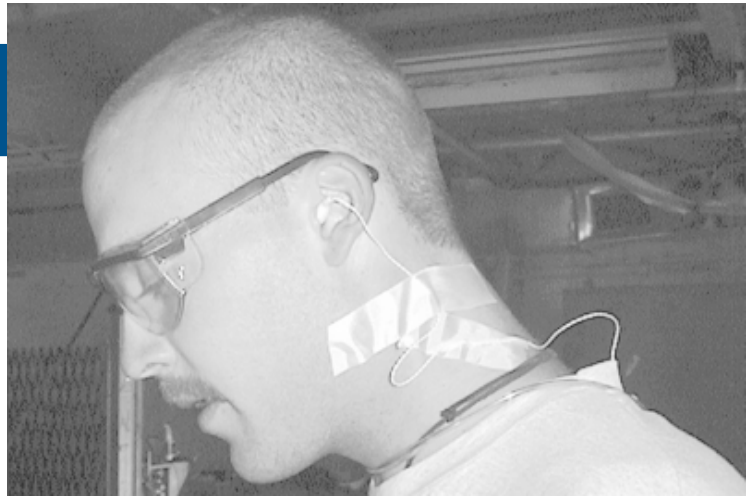
Worker Protection: Heat Stress Monitoring System

OST Reference #1953

The heat stress monitoring system is designed to monitor the vital signs of workers performing work in conditions that might be conducive to heat exhaustion or heat stress. The system provides real-time data on the physiological condition of workers, and is particularly useful when workers are wearing personal protective clothing or respirators.

Benefits:

- Real-time physiological monitoring helps prevent potential



Heat Stress Monitoring System



FRHAM-Tex Cool Suit

heat stress situations

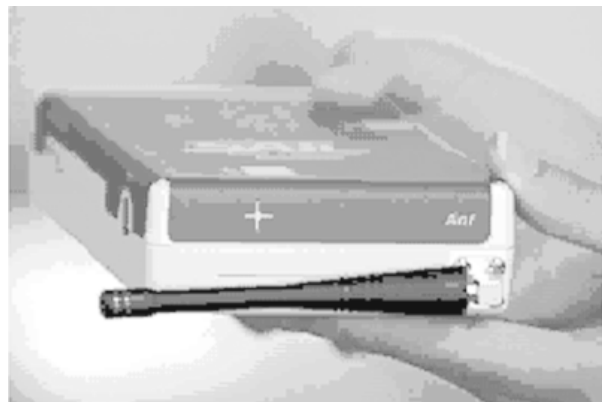
- The ability to set preset alarm levels provides for maximum efficiency without undue risk

Other Worker Protection Technologies:

Wireless Remote Monitoring System (#2104)

FRHAM-Tex Cool Suit (#1854)

NU-FAB Suit (#1855)



Wireless Remote Monitoring System

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